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Testing for Instrumental Variable Validity with High-dimensional Data

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Venue: WYL314, 3/F, Dorothy Y. L. Wong Building,
**   Lingnan University**

ABSTRACT:

We propose a new overidentifying restrictions test for linear IV models. The novelty of the proposed test is that first, it allows the number of covariates to be larger than the sample size; second, it is robust to heteroskedastic errors. We show the test has desired theoretical properties and is more powerful than conventional overidentification tests. Our testing procedure contains two components. The first component is a maximum test based on estimation and inference for the maximum norm of high-dimensional parameters in a linear IV model. The theoretical power of the proposed maximum test is shown to be higher than the modified Cragg-Donald (MCD) test (Kolesár, 2018), which is the only existing test allowing for large dimensional covariates. The second component is a zero-size quadratic test used to enhance the empirical power against many weakly invalid instruments. While constructing the test statistic, we also provide a feasible estimator for practitioners when IV validity is not rejected. Simulation results show the superior performance of the proposed test, and the empirical power enhancement is apparent. At last, an empirical example of the trade and economic growth nexus manifests the usefulness of the proposed tests.

BIOGRAPHY:

Michael Qingliang Fan is an Assistant Professor of economics at The Chinese University of Hong Kong. He is interested in both theoretical and applied econometrics, with a focus on micro-econometrics in a data-rich environment, and big data. His papers were published by academic journals including Econometrics Theory, Journal of Business and Economics Statistics, Journal of Econometrics, Review of Economics and Statistics, and Strategic Management Journal. Some of his ongoing research projects relate to labor economics, financial economics and decision science. Before joining CUHK in 2020, he was on the faculty of Xiamen University.

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